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10/775,511	02/10/2004	Tihiro Ohkawa	11252.40	1055

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EXAMINER
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ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/775,511

Applicant(s)

OHKAWA, TIHIRO

Examiner

Rudy Zervigon

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 17-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/25/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of group I, claims 1-16 in the reply filed on March 3, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 recite the limitation "said rotating plasma". There is insufficient antecedent basis for this limitation in the claim.

5. Claim 2 recite the limitation "said vaporizing means". There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Borghs; Gustaaf Regina et al. (US 5779802 A). Borghs teaches:

i. A system (Figure 1; column 4, line 23 - column 5, line 30) for injecting a feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) into Borgh's plasma chamber (10; Figure 1) to convert the feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) into a plasma (column 1; lines 58-61), said plasma chamber (10; Figure 1) having a substantially cylindrical wall centered on an axis and containing a plasma (column 1; lines 58-61) having a substantially azimuthal rotation about said axis, said system (Figure 1; column 4, line 23 - column 5, line 30) comprising: an injector (Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) for introducing a fluid jet of said feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) into Borgh's chamber at a predetermined velocity and with a preselected jet radius, with said injector (Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) positioned and oriented to direct said fluid jet from said wall, transversely through said rotating plasma (column 1; lines 58-61) to a target volume (14; Figure 1) in said plasma chamber (10; Figure 1), said target volume (14; Figure 1) being located substantially on said axis; and a means for vaporizing (52; Figure 1; column 5; lines 13-23) said feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) at said target volume (14; Figure 1) to create a plasma (column 1; lines 58-61) from said feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12), as claimed by claim 1

ii. A system (Figure 1; column 4, line 23 - column 5, line 30) as recited in claim 1 wherein said vaporizing (56, 52; Figure 1; column 5; lines 13-29) means comprises a laser source (52; Figure 1; column 5; lines 13-23) for creating a laser beam (44; Figure 1; column 5; lines 13-23)

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to irradiate said feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) at said target volume (14; Figure 1) , as claimed by claim 2

iii. A system (Figure 1; column 4, line 23 - column 5, line 30) as recited in claim 1 wherein said vaporizing (56, 52; Figure 1; column 5; lines 13-29) means comprises a microwave source (56; Figure 1; column 5; lines 13-29) for creating a microwave beam to irradiate said feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) at said target volume (14; Figure 1) , as claimed by claim 3

iv. A system (Figure 1; column 4, line 23 - column 5, line 30) as recited in claim 1 wherein the feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) includes a compound selected from the group consisting of a metal oxide (column 7, lines 13-26) and a metal nitrate, as claimed by claim 4

v. A system (Figure 1; column 4, line 23 - column 5, line 30) as recited in claim 4 wherein said compound is dissolved in a solvent selected from the group consisting of water and sodium hydroxide – intended use recitation in apparatus claims, as claimed by claim 5

vi. A system (Figure 1; column 4, line 23 - column 5, line 30) as recited in claim 1 wherein said fluid jet of feed material (from Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) arrives at said target location as droplets – intended use recitation in apparatus claims. The cited apparatus is capable of performing the intended use, as claimed by claim 6

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 7, 9-11, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borghs; Gustaaf Regina et al. (US 5779802 A) in view of Maschwitz; Peter et al. (US 6444945 B1). Borghs is discussed above. Borghs further teaches a plasma mass filter (Figure 1) for separating a multi-constituent material into constituents, Borgh's plasma mass filter (Figure 1) comprising: a cylindrical shaped wall surrounding Borgh's plasma chamber (10; Figure 1) and defining a longitudinal axis, said cylindrical shaped wall having a first end and a second end and being formed with at least one chamber inlet (from 48, 50; Figure 1) positioned therebetween; means for generating a magnetic field (56; Figure 1; column 5; lines 13-29) in Borgh's chamber, Borgh's magnetic field (56; Figure 1; column 5; lines 13-29) being aligned substantially parallel to said longitudinal axis – claim 9

Borghs further teaches:

i. an injector (Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) for introducing a fluid jet of said multi-constituent material through Borgh's chamber inlet (from 48, 50; Figure 1) and into Borgh's chamber at a predetermined velocity and with a preselected jet radius, with said injector (Knudsen cells 48, 50; Figure 1; column 5, lines 8-12) positioned and oriented to direct said fluid jet in a substantially radial direction from said wall to a target volume (14; Figure 1) in said plasma chamber (10; Figure 1), said target volume (14; Figure 1) being located substantially on said longitudinal axis; and a means for vaporizing (52; Figure 1; column 5; lines 13-23) said multi-constituent material at said target volume (14; Figure 1) to create a multi-species plasma (column 1; lines 58-61) having high-mass particles and low-mass particles in Borgh's chamber – claim 9

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ii.A filter (Figure 1) as recited in claim 9 wherein said vaporizing (56, 52; Figure 1; column 5; lines 13-29) means comprises a laser source (52; Figure 1; column 5; lines 13-23) for creating a laser beam (44; Figure 1; column 5; lines 13-23) to irradiate said multi-constituent material at said target volume (14; Figure 1), as claimed by claim 10

iii.A filter (Figure 1) as recited in claim 9 wherein said vaporizing (56, 52; Figure 1; column 5; lines 13-29) means comprises a microwave source (56; Figure 1; column 5; lines 13-29) for creating a microwave beam to irradiate said multi-constituent material at said target volume (14; Figure 1), as claimed by claim 11

iv.A filter (Figure 1) as recited in claim 9 wherein Borgh's chamber inlet (from 48, 50; Figure 1) is positioned substantially midway between said first end of said wall and said second end of said wall, as claimed by claim 13

v.A filter (Figure 1) as recited in claim 9 wherein said means for generating Borgh's magnetic field (56; Figure 1; column 5; lines 13-29) is a magnetic coil (inherent in ERC apparatus) mounted on said wall, as claimed by claim 15

Borghs does not teach:

i.A system (Figure 1; column 4, line 23 - column 5, line 30) as recited in claim 6 wherein said droplets have a diameter less than approximately 60 micrometers, as claimed by claim 7

ii.means for generating an electric field substantially perpendicular to Borgh's magnetic field (56; Figure 1; column 5; lines 13-29) to create crossed magnetic and electric fields, said electric field having a positive potential on said longitudinal axis and a substantially zero potential on said wall – claim 9

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iii.to interact with said crossed magnetic and electric fields for ejecting said high-mass particles into said wall and for confining said low-mass particles in Borgh's chamber during transit therethrough to separate said low-mass particles from said high-mass particles – claim 9

iv.A filter (Figure 1) as recited in claim 9 wherein "e" is the charge of the particle, wherein said wall is at a distance "a" from said longitudinal axis, wherein Borgh's magnetic field (56; Figure 1; column 5; lines 13-29) has a magnitude "B," in a direction along said longitudinal axis, wherein said positive potential on said longitudinal axis has a value " $V_{c,r}$ ", wherein said wall has a substantially zero potential, and wherein said low-mass particle has a mass less than  $M_G$ , where  $M_c = e a r(B,r) / 8 V$  ir, as claimed by claim 14.

v.A filter (Figure 1) as recited in claim 9 wherein said means for generating said electric field is a plurality of conducting rings mounted to said first end of said wall and centered on said longitudinal axis at one end of Borgh's chamber, as claimed by claim 16

Maschwitz teaches an effusion / Knudsen cell source (Figures 4,5; column 9, line 56 – column 10, line 35) including:

viii.means for generating an electric field (30, 31; Figure 5) substantially perpendicular to Maschwitz's magnetic field (34, 36; Figure 5) to create crossed magnetic and electric fields – claim 9

ix.A filter (Figure 1) as recited in claim 9 wherein said means for generating said electric field is a plurality of conducting rings (30,31) - claim 16

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Borghs's effusion cell(s) with Maschwitz's effusion cell under optimized operation.



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Motivation to replace Borghs's effusion cell(s) with Maschwitz's effusion cell effusion cell under optimized operation is for employing an improved effusion source for vapor flux used in depositions as taught by Maschwitz (column 4; lines 36-45).

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Borghs; Gustaaf Regina et al. (US 5779802 A) in view of Schultz; Peter G. et al. (US 5776359 A). Borghs is discussed above. Borghs does not teach a system (Figure 1; column 4, line 23 - column 5, line 30) as recited in claim 6 further comprising a means for producing vibrational energy to break up said droplets, as claimed by claim 8

Schultz teaches a vaporizing means (242, 240, 244; Figure 6) comprises a vibrational excitation source (218) for injected droplets (246), as claimed by claim 8.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Borghs's vaporizing means to the apparatus of Schultz.

Motivation to add Borghs's vaporizing means to the apparatus of Schultz is to manufacture desired materials and products as taught by Schultz (column 1; lines 10-26).

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Borghs; Gustaaf Regina et al. (US 5779802 A) and Maschwitz; Peter et al. (US 6444945 B1) in view of Schultz; Peter G. et al. (US 5776359 A). Borghs and Maschwitz are discussed above. Borghs and Maschwitz do not teach a filter (Figure 1) as recited in claim 9 wherein said vaporizing (56, 52; Figure 1; column 5; lines 13-29) means comprises a vibrational excitation source for injected droplets, as claimed by claim 12

Schultz teaches a vaporizing means (242, 240, 244; Figure 6) comprises a vibrational excitation source (218) for injected droplets (246), as claimed by claim 12.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Borghs's vaporizing means to the apparatus of Schultz.

Motivation to add Borghs's vaporizing means to the apparatus of Schultz is to manufacture desired materials and products as taught by Schultz (column 1; lines 10-26).

### *Conclusion*

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.



4/17/16